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ABSTRACT

In all likelihood, computer use in early childhood will continue to increase. However, there is reason for concern about how computers will be placed into classrooms, what activities will be chosen for children, what interactions will take place, and whether these interactions will consider appropriate readiness and development levels. Computers should be used to promote cognitive development of young people in the classroom. Such use should: (1) take advantage of the powerful interactive nature of the computer; (2) consider the readiness of the child; and (3) not require sophisticated keyboarding skills. Research and reviews of software suggest that valuable software satisfying these criteria is available. Included in this document is a list of 20 software packages reviewers see as having qualities that promote thought processes in kindergarten children and primary school students. (RH)

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VALUABLE ALTERNATIVES TO KEYBOARDING IN GRADES K-3

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VALUABLE ALTERNATIVES TO KEYBOARDING IN GRADES K-3

ABSTRACT

The computer should be utilized to promote cognitive development of young people in the classroom in ways which: 1) take advantage of the powerful interactive nature of the computer, 2) take into account the readiness of the child, and 3) do not require sophisticated keyboarding skills. Research and reviews of software suggest that valuable software which satisfy these criteria is available and therefore is recommended for young people who will be taking their place in society in a future embedded in technology.

Valuable Alternatives to Keyboarding in Grades K-3

Introduction

Can the computer be utilized to promote important cognitive, affective and social development in young children? The realization of the potential of computers in early childhood classrooms is being carefully investigated by many people at this time (Brady and Hill, 1984; Sloan, 1984; Noble, 1984). Much of the dialogue centers around the question of <u>how</u> the computer is being used in the classroom. "Even kindergarten and first grade are not too early to begin exploring the computer's potential. Indeed, if integrated carefully into other classroom activities, the computer may rapidly come to be one of the first grade teacher's most valuable instructional tools" (Roblyer, p. 10). Reed (1983) encourages young people's interaction with computers <u>if</u> thought is given to the appropriate selection of activities which attend to readiness and promote development.

As a specific aspect of how the computer can be most effectively utilized in the classroom, this paper will address keyboarding instruction. At all levels of schooling, advocates of keyboarding skills are requesting the use of courseware designed solely to teach students touch typing. While there is some agreement with teaching these skills beginning at upper elementary levels, there continues to be controversy over the

value of such instruction for children in grades K-3. This paper will discuss some of the reasons why keyboarding should not be an important part of the computer curriculum in these grades. The following statements form a defense for delaying students' instruction in specific keyboarding skills.

1) There is a need for students to experience the interactive power of the computer as soon as possible. The computer is not merely a typewriter.

2) There is very little evidence supporting the assumption that kindergarten and early primary students have the psychomotor development for two-handed typing skills.

3) There is research which supports the value of computers in the classroom for promoting cognitive, affective, and social skills.

4) There is presently available valuable software which does not require keyboarding skills.

5) There are increasingly frequent predictions that voice synthesizers, the "mouse", optical scanners, and pressure-sensitive screens will replace typewriters in the future.

Computer Versus Typewriter

An important use of the computer is to promote that kind of learning which is unique to the computer. Unfortunately, the most accessible function of the computer for the inexperienced teacher and administrator is as a typewriter. Consequently, computers are added to the curriculum as little more than expensive typing tutors. Professional educators should avoid the premature injection of "computers" into the curriculum if the students' initial exposure to computers does not provide experiences which "sell" the computer as a vehicle for valuable problem-solving. "Ultimately, it is the unparalleled interactive capacity of computers that educators point to as the principle ingredient that makes the technology worth all the fuss" (Karoff, 1983, pg. 50). This interactive capacity is far from being met when the computer is reduced to a mere typewriter. There are far too many examples of students developing worthwhile skills which are primarily promoted by interacting with the computer to continue using it merely as an expensive typing tutor.

Turkle (1984) expresses no doubt about the unique impact of computers on young people. "Children in a computer culture are touched by the technology in ways that set them apart from the generations that have come before" (Turkle, 1984, p. 165). Through their family, friends, movies, games, and television students come to school very much aware of the place of computers in society today and their acceptance and

excitement with this new interactive media exceeds that of most adults. There is a danger of destroying this enthusiasm if students' initial interaction with the computer does not promote their thinking about thinking itself (Papert, 1980). The computer is not a typewriter and students need to be encouraged to "see" the computer as a powerful ally in their world.

Psychomotor Development and the Computer

Curricular decision-making for early childhood always demands careful attention to readiness and psychomotor development. Pressure to perform tasks for which the student is not yet ready can diminish progress in reading, writing, arithmetic and discourage computer usage as well. For example, when one considers the actual size of a young child's hands, it should be apparent that touch typing is a premature activity at this stage of psychomotor development.

Whether an adult or a child, learning to type involves the same process: the placement of the hands in "home" position, memorizing the entire keyboard, memorizing which fingers are to be used to type the letters on the keyboard, and gaining enough confidence in this knowledge to practice without looking at the keyboard. In fact, during the initial stages of learning to type, young students place their hands in the "home" position, but then have to remove them to see the keys which are underneath their fingers in order to actually type the letters. The physical span of the fingers is not yet sufficient to cover

the required keys in "home" position, and yet, one of the objectives to be met in touch typing programs is correct finger placement in "home" position.

In addition to physical dexterity, learning to type involves several other independent skills, including letter recognition, letter location on the keyboard, discrimination between lower and upper case letters, and the skills needed to combine letters into words. If young students are still struggling with the recognition and order of letters in the alphabet, it seems premature to worry the student with <u>where</u> the "a" is on the keyboard and <u>which</u> finger should be used to type the "a." When the student is ready to find the "a" in order to continue interacting with a piece of software, a search-and-find process will promote readiness for later attention to keyboarding explicitly.

For the young child, keyboarding skills at the typewriter are similar to keyboarding at the piano. Piano teachers who work with this age student also fear a premature pressure on students' use of both hands simultaneously. These teachers believe that a relaxed attitude has to be maintained as students develop the necessary psychomotor skills or their later musical interpretation will be inhibited. Therefore, a hierarchy of objectives is prescribed. Attention is given to rudimentary fingering skills to correct for correct hand posture. However, listening skills are actually more important and more time is spent with the student developing an "ear" for

music. Analogously, young children working at the computer should be focusing on thought processing - not which fingers are on which keys.

Research Supporting Cognitive, Affective, and Social Development

Contained within the plethora of writing in the area of educational computing are many important references to work with computers which do suggest meaningful and valuable growth on the part of young people. The research is restricted to small groups, is ethnographic in nature, and often deals with specially formed groups of students, but nevertheless, there are strong indications that if the computer is used properly in the classroom, it can bring about measurable growth in the areas of social, psychological, and academic performance.

Preschool computer programs have been successful in developing letter recognition, number recognition, identification of color and shape, directionality, and logical thinking (Brady and Hill, 1984; Burg, 1984; Chin, 1984; Williams, 1984). Also, young children interacting with computers became more cooperative, more autonomous, more patient and their self-esteem increased (Burg, 1984; Chin, 1984; Williams, 1984). Additionally, eye-hand coordination and fine motor development are enhanced through the use of computers (Burg, 1984; Chin, 1984). All of these skills and attitudes resulted from students interacting with computers without having any touch typing skills. Furthermore, it is clear from this

literature that those in charge of students' interaction with computers explicitly chose the software which promoted cognitive, affective and social development.

Valuable Available Software

Evaluation of the large amount of educational software available today can be found in the literature on computers and education. Unfortunately, much of this software has limited educational value. "Less than five percent of educational software makes use of the unique capabilities of microcomputers" (Bell, 1984, p. 81). In order for software to be effective, Begole (1984), Chin (1984), and Horowitz (1983) suggest that one must consider 1) the usefulness and extent of the documentation, 2) the appropriateness of the graphics, 3) the level of difficulty for the target age group, and 4) the extent to which the student can creatively experiment and not become confused.

A common characteristic of the software packages which meet these criteria is the use of single-stroke key punching. "They (preschool children) were well able to use the standard keyboard, and had little trouble finding the right key to make the simple single-key responses required" (Muller, 1983, p. 87). This adaptation in the software for young children is the result of careful consideration of their special needs. Consequently, valuable learning is being promoted without the students' need for typing skills.

When only these few keystrokes are necessary for valuable interaction with the software, it is important to point out that students are simply too engrossed in their activity to worry about the correct position of their fingers. If the teacher penalizes the student for incorrect fingering, the cognitive value of the task is definitely and tragically lost. On several occasions, students have been observed obediently putting their hands in the "home" position until they have to find a letter on the keyboard. Once they find the key, they awkwardly reposition their fingers so as to continue. By this time, they may have forgotten what the initial cognitive task was. Or, the students who are actively engaged in a problem-solving situation will probably not use the correct fingering if the teacher is not watching. Instead, they will use whichever finger is handy.

The following list contains software packages which have been reviewed as possessing those qualities which promote valuable thought processing for students in grades K-3. This list is by no means exhaustive. It does, however, indicate that quality software does exist for this age student.

Title	Source	Review
A B sCenes I	Compu-Teach Inc.	Smith, 1984
Alphabet Circus	DLM	Education, 1984
Alphabet Beasts & Co.	Software Productions	Murphy, 1983
Bumble Plot	The Learning Co.	Rae, 1984
Early Games for Young Children	Counterpoint Software	Murphy, 1983

Early Games Pieces of Cake	Counterpoint Software	Ross and Klawitter, 1984
Electronic Playground	Software Entertainment Co.	Staples, 1984
Gertrude's Secrets	The Learning Co.	Watt, 1983
Leepers Creatures	Kangaroo, Inc.	Staples, 1984
Learning with Leeper	Sierra On-Line	Barth, 1984
Letters and Words	Learning Well	Smith, 1984
Monkeymath	Artworx Software	Gabel, 1983
Number Farm	DLM	Education, 1984
Shape & Color Rodeo	DLM	Education, 1984
Spelling Bee	Edu-Ware Services	Staples, et al, 1983
Stickybear ABC	Xerox Ed. Publ.	Holman, 1983
Stickybear Number	Xerox Ed. Publ.	Murphy, 1983
Story Tree	Scholastic, Inc.	Solomon and Solomon,1984; O'Malley, 1984
Telly Turtle	Carousel Software	Staples, 1984
Word Pieces	Compu-Teach Inc.	Smith, 1984

Gertude's Secret's is an excellent example of a piece of software which promotes cognitive development. Logical reasoning is required for the student to successfully perform the sorting and logical sequencing in this package. The only keys the students need are the letters I, J, K, M which move the cursor up, down, left and right on the screen and the space bar

for catching various objectives to move to alternate locations.

Telly Turtle is another piece of software where the same I, J, K, M keys are used to move the cursor (a turtle) around on the screen for the purpose of drawing pictures, thus promoting the students' use of graphics. The logical sequential thought encouraged in this software is unique to computers.

One of the games in the software entitled Early Games for Young Children asks children to select the one shape of four displayed which is different from the other three. Their choice is made by punching 1, 2, 3, or 4, using only the top row of "number" keys. This same procedure is used with Stickybear Numbers, a software package which extends counting and number concepts in grades K-3.

In addition, there are several pieces of software which have a multitude of applications if the teacher is willing to prepare classroom activities which utilize the interaction contained in the packages. For example, the literature is full of reference to Logo. Specifically, in grades K-2, there are single-stroke Logo packages available or which can be prepared, and have been shown to be successful with young students (Ball, 1984; Clements, 1984; Hines, 1983).

There are also several pieces of software designed so that no keyboarding skills are necessary. For example, Learning with Leeper and Electronic Playground require the use of only a

joystick. Learning with Leeper includes directing a frog through a maze where the student must properly use directionality. Electronic Playground includes games for matching a number, shape or letter to that which appears on the screen.

When this type of software is used in the classroom, an appreciation for students' abilities is contagious. As one watches them become totally absorbed in problem-solving interaction with the computer, there is little doubt that valuable thinking strategies are being exhibited. Whether children work with partners or individually, there is an air of concentration present. Trying different strategies and experiencing the consequences promotes visible progress toward a solution. At the end of the activity, students do not have to be told whether or not they were right, as they themselves sense closure. Such experiences lead toward important independence of thought.

Future Need for Keyboarding Skills

Students who are enrolled in early childhood classes this year will not be actively employed for at least ten years. While, there is much speculation as to the state of the art of communication, there is general agreement that we will be interacting with technology in ways which will not necessitate typing skills. Voice synthesis, optical scanning, and the more friendly use of icons for inputting into computers are examples

of future modes of communication. Many feel that keyboards as presently organized will become a thing of the past.

It seems impractical in our rapidly changing world to defend teaching keyboarding skills to young children at the expense of their much more valuable cognitive skill development. If, in fact, typewriter keyboards are still present ten to fifteen years from now, other forms of communication will also be present. The multitude of pressures on the educational enterprise speak most passionately about tomorrow's citizens being able to make decisions with data, being able to intelligently sort data, and being able to solve problems - all cognitive functions which are not dependent on just one mode of communication. The prerequisite skills for successful coping in the future should be promoted through divergent methods beginning when students first enter school.

Summary

In all likelihood, computer usage in early childhood will continue to increase. There is simply too much potential to be developed in terms of students' learning for computers to go away. However, there is reason for concern with respect to how the computers will be placed into classrooms, what activities will be chosen for children, and what interactions will take place which may or may not consider appropriate readiness and development levels. The cognitive, affective, and social development of children can occur with the help of the

computer when alternatives to keyboarding are considered. Let children take advantage of the computer's powerful interactive nature with software which is designed for thought-processing without the need of sophisticated keyboarding skills.

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